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CLAIMS

1. Apparatus for purifying water to USP or WFI purification standards, comprising:

a heat exchanger adapted to receive chlorinated feed water to be purified, said heat exchanger heating the feed water to a predetermined temperature;

a filter connected to said heat exchanger for receiving feed water therefrom, said filter being a microfilter or an ultrafilter having a nominal pore size of about 0.1 microns or less to be capable of removing bacteria from the feed water;

a filtrate reservoir connected to said filter for receiving filtrate therefrom;

a dechlorinator connected to said reservoir to receive filtrate from the reservoir, said dechlorinator removing chlorine from the filtrate;

a backwash line connected to said reservoir to receive filtrate from the reservoir and direct the filtrate in reverse flow through the filter to backwash the filter; and

a still connected to said dechlorinator to receive dechlorinated filtrate therefrom and distill the same to provide USP or WFI quality purified water, said still being a vapor compression still or a multiple effect still.

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2 2. The apparatus of claim 1 further including a reverse osmosis membrane unit interposed between said still and said dechlorinator.

2 3. The apparatus of claim 1 further including a filtrate treating anti-scalant device upstream of said still for treating filtrate so as to eliminate or minimize scaling within said still.

2 4. The apparatus of claim 3 wherein said filtrate treating anti-scalant device is a water softening device located upstream of said dechlorinator and downstream of said reservoir.

2 5. The apparatus of claim 3 wherein said filtrate treating anti-scalant device is a chemical injector for injecting anti-scaling chemicals into said filtrate downstream of said dechlorinator.

6. Apparatus for purifying water to USP or WFI purification standards, consisting essentially of:

a chlorine tolerant ultra filtration or micro filtration filter unit having the capability of removing bacteria from a chlorinated feed water stream;

a dechlorination unit connected to said filter unit for receiving filtrate therefrom;

a vapor compression or multiple effect still connected to said dechlorination unit for distilling the filtrate to produce purified water at USP or WFI purification standards; and

a water softening system located connected between said filter unit and said dechlorination unit to remove scale causing constituents from said filtrate.

7. The apparatus of claim 6 wherein said filter is a microfiltration filter having a nominal pore size of about 0.1 microns or less.

8. The apparatus of claim 7 wherein said filter is a polyvinylidene filter.

9. The apparatus of claim 6 wherein said filter is an ultra filtration filter having a nominal pore size of about 80,000 Dalton MWCO or less.

10. The apparatus of claim 9 wherein said filter is a polyacrylonitrile filter.

11. Apparatus for purifying water to USP or WFI purification standards, consisting essentially of:

a chlorine tolerant ultra filtration or micro filtration filter unit having the capability of removing bacteria from a chlorinated feed water stream;

a dechlorination unit connected to said filter unit for receiving filtrate therefrom;

a vapor compression or multiple effect still connected to said dechlorination unit for distilling the filtrate to produce purified water at USP or WFI purification standards;

a reverse osmosis unit connected between said dechlorination unit and said still; and

an anti-scale chemical injection unit connected between said dechlorination unit and said reverse osmosis unit.

12. The apparatus of claim 11 wherein said filter is a microfiltration filter having a nominal pore size of about 0.1 microns or less.

13. The apparatus of claim 12 wherein said filter is a polyvinylidene filter.

14. The apparatus of claim 11 wherein said filter is an ultra filtration filter having a nominal pore size of about 80,000 Dalton MWCO or less.

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2 15. The apparatus of claim 14 wherein said filter is a
polyacrylonitrile filter.

2 16. A method of producing USP purified water or water for
injection comprising:

- 4 (a) providing a chlorinated feed water;
- 6 (b) filtering the feed water in a chlorine tolerant microfilter
or ultrafilter having a nominal pore size of 0.1 microns
or less;
- 8 (c) antiscalc treating the filtrate from the filter; and
- (d) distilling the antiscalc treated filtrate.